

**Claims:**

1. An arrangement for cooling a roll, the arrangement comprising a housing to be secured to the roll, a hollow shaft mounted for rotational movement within the housing and a cooling medium line to convey cooling medium into the roll via the interior of the shaft; the cooling medium line comprising an inlet or outlet communicating with an elbow portion, a first length of the elbow portion extending from the inlet or outlet substantially perpendicular to the axis of the shaft and a second length of the elbow portion extending from the first length in the direction of the axis of the shaft, the axes of the first and second lengths being in substantially the same plane.
2. An arrangement according to claim 1, wherein the cooling medium line comprises an inlet.
3. An arrangement according to claim 1 including:
  - (i) a first cooling medium line to convey cooling medium into the roll via the interior of the shaft, the first cooling medium line comprising an inlet communicating with a first elbow portion, a first length of the first elbow portion extending from the inlet substantially perpendicular to the axis of the shaft and a second length of the first elbow portion extending from the first length in the direction of the axis of the shaft, the axes of the first and second lengths being in substantially the same plane; and
  - (ii) a second cooling medium line to convey cooling medium out of the roll via the interior of the shaft, the second cooling medium line comprising an outlet communicating with a second elbow portion, a first length of the second elbow portion extending from the outlet substantially perpendicular to the axis of the shaft and a second length of the second elbow portion extending from the first length in the direction of the axis of the shaft, the axes of the first and second lengths being in substantially the same plane.

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4. An arrangement according to any preceding claim, wherein the internal wall of the elbow portion has a bend radius between the first length and the second length.
- 5 5. An arrangement according to any preceding claim, wherein the elbow portion includes mounting means for mounting the elbow portion to the shaft.
6. An arrangement according to claim 5, wherein the mounting means is an annular flange provided on the external surface of the first length of the elbow portion, the annular flange being adjacent the external wall of the shaft.
- 10 7. An arrangement according to any preceding claim, wherein the first length of the elbow portion is provided with external connection means and/or internal connection means for connecting a pipe for conveying cooling medium.
- 15 8. An arrangement according to claim 7, wherein the first length is provided with both external and internal connection means.
9. An arrangement according to claim 7 or 8, wherein the connection means comprises a threaded connection that engages a correspondingly threaded pipe connector.
- 20 10. An arrangement according to any preceding claim, wherein the second length of the elbow portion is provided with external connection means and/or internal connection means for connecting a conduit that conveys cooling medium.
- 25 11. An arrangement according to claim 10, wherein the second length is provided with both internal and external connection means so that two different radial sizes of conduit can be connected to the elbow portion.
- 30 12. An arrangement according to claim 10 or 11, wherein the connection means comprises one or more elongate ridges in the direction of the axis of the shaft on the internal and/or external surface of the second length of the elbow portion.

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13. An arrangement according to any preceding claim, wherein the cooling medium line is substantially cylindrical.

14. An arrangement according to any preceding claim, wherein the distal end of the shaft is sealed.

15. An arrangement according to any preceding claim, wherein the proximal end of the shaft has an annular flange against which the housing abuts.

16. An arrangement according to claim 15, wherein a spacer is provided between the housing and the annular flange of the shaft so that the positioning of the housing on the shaft can be adjusted.

17. An arrangement according to any preceding claim including a delivery flow path that delivers cooling medium into the roll via the interior of the shaft and a return flow path for outflow of cooling medium via the interior of the shaft.

18. An arrangement according to claim 17, wherein the delivery flow path comprises an inlet communicating with the elbow portion and a conduit connected to the second length of the elbow portion that delivers cooling medium into the roll, whereby at least part of the conduit is positioned in the interior of the hollow shaft along the axis of the shaft; and the return flow path conveys cooling medium between the outer surface of the conduit and the internal wall of the shaft to an outlet.

19. An arrangement according to claim 18, wherein the conduit is substantially cylindrical.

20. An arrangement according to claim 18 or 19, including a channel in the shaft communicating with the outlet, a first length of the channel extending from the outlet substantially perpendicular to the axis of the shaft and a second length of the channel extending from the first length in the direction of the axis of the shaft, the axes of the first and second lengths of the channel being in substantially the same plane.

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21. An arrangement according to claim 20, wherein the internal wall of the hollow shaft tapers towards the second length of the channel.
- 5 22. An arrangement according to claim 20 or 21, wherein the walls of the channel are substantially rounded.
23. An arrangement according to any of claims 20 to 22, wherein the first length of the channel is internally threaded for engagement of a pipe connector.
- 10 24. An arrangement according to any preceding claim, wherein the shaft is provided with pressure release means for releasing internal pressure in the shaft when the internal pressure substantially exceeds a threshold pressure level.
- 15 25. An arrangement according to claim 24, wherein the pressure release means is provided by a portion of the shaft having a thinner wall than the wall of remainder of the shaft, the thinner walled portion being arranged to rupture when the internal pressure exceeds a threshold pressure level.
- 20 26. An arrangement according to claim 25, wherein the thinner walled portion of the shaft is provided by a bore in the wall of the shaft.
- 25 27. An arrangement for cooling a roll, the arrangement comprising a housing to be secured to the roll, a hollow shaft mounted for rotational movement within the housing and a cooling medium line to convey cooling medium into the roll via the interior of the shaft, wherein the shaft is provided with pressure release means for releasing internal pressure in the shaft when the internal pressure substantially exceeds a threshold pressure level.
- 30 28. An arrangement according to claim 27, wherein the pressure release means is provided by a portion of the shaft having a thinner wall than the wall of remainder of the shaft, the thinner walled portion being arranged to rupture when the internal pressure exceeds a threshold pressure level.

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29. An arrangement according to claim 28, wherein the thinner walled portion of the shaft is provided by a bore in the wall of the shaft.